**What effect does smoking and having asthma have on the respiratory system even for elite athletes?**

***Smoking:***

Smoking can impair lung function and can lead to a decrease in overall health. Damage to the respiratory system from smoking is slow and can be deadly if left to progress to dangerous levels. A healthy respiratory system is continuously cleansed by the mucus produced by the respiratory tubules. These traps dirt and disease-causing organisms, which cilia sweep toward the mouth, where it can be dealt with and removed. With the very first inhalation of smoke, the beating of the cilia slows. With further time, the cilia become paralyzed and eventually are removed altogether. The loss of cilia leads to the development of smoker's cough.

Because the loss of cilia means mucus is no longer effectively removed, this leads to more coughing as this mucus must be removed somehow and this can be worst in the morning as mucus accumulates over night. This build up of mucus is not good as it clogs up airways making breathing difficult and the lungs cannot work effectively if they are not receiving enough air through breathing.

Smoking also leads to an increase in the risk of gaining respiratory diseases and infections like chronic bronchitis from a bad smoker’s cough or emphysema. Emphysema is caused when mucus production increases and the lining of the bronchioles thicken, making breathing difficult. The bronchioles lose elasticity and are no longer able to absorb the pressure within the alveoli (microscopic air sacs) enough to rupture the delicate alveolar walls. This is a smoking induced disease.

***The effects of smoking on performance:***

Smoking decreases the efficiency of the respiratory system to take in and supply oxygen to our working muscles. When we exercise, our heart rate increases in order to meet the blood oxygen demands of our muscles. Generally, the faster our heart rate, the more oxygen the working muscles need. Cigarettes contain carbon monoxide, which binds to the haemoglobin in our blood more effectively than oxygen does, which means that the muscles are unable to get the oxygen that they require during exercise which makes our heart work even harder. This result in fatigue occurring sooner and more lactic acid building up as there is less oxygen to remove the unwanted products our muscles produce when performing exercise.

As well as reducing our body's oxygen intake, smoking also narrows our blood vessels. This makes pumping blood throughout our body a slower and more difficult process while performing. It also puts extra strain on your heart every time it pumps because it has to work harder in order to supply your body with the blood oxygen it needs to function and provide the muscles with the demand of oxygen they need.

***Asthma:***

**Asthma is a common long-term condition that can cause problems like coughing, wheezing, chest tightness and breathlessness.** The severity of these symptoms varies from person to person and some people can be control it well most of the time, although some people may have more persistent problems. Occasionally, asthma symptoms can get gradually or suddenly worse. This is known as an "asthma attack".

Asthma is caused by the inflammation of small tubes called bronchi, which carry air in and out of the lungs. For people who have asthma, the bronchi are inflamed and more sensitive than normal.

When you come into contact with something that irritates your lungs your airways become narrow, the muscles around them tighten, and there is an increase in the production of sticky mucus. These irritants are called ‘triggers’. Common asthma triggers include:

* House dust mites
* Animal fur
* Pollen
* Cigarette smoke
* Exercise
* Viral infections

***The effects of asthma on performance:***

During exercise, we often breathe faster through our mouth causing cold and dry air to travel to our lungs. This cold and dry air can cause the muscles around the airways to tighten, increasing the chance of experiencing asthma symptoms.

Shortness of breath during and after exercise is common. However, if physical activity causes symptoms with no relief after rest, it means you have exercise-induced asthma. Those symptoms include shortness of breath, a tight chest, dry cough and wheezing

It is the type of exercise, the amount of time spent exercising and the intensity that is important. Asthma reduces performance especially in elite aerobic athletes as they rely on a strong oxygen supply to the lungs and muscles which is hindered by asthma.

***The management of asthma:***

Asthma can be managed using medical treatment. There are two types of inhalers which can be used; the blue one is a ‘reliever’ which relaxes muscles around airways and is normally taken before exercise when the subject feels symptoms, and there is the ‘preventer’ which is not blue and this suppresses the chronic inflammation of the airway structures and is normally taken daily to avoid the symptoms coming forward.

Asthma can also be managed by non-medical treatments. A warm-up helps provide a ‘refractory period’ for up to two hours which avoids exercise induced asthma. Caffeine is also a bronchodilator so this can be taken pre-exercise to suppress any symptoms. Because there are many triggers for people’s asthma, if these triggers are taken out the person living environment it means less symptoms will be felt and the effects can be avoided.